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COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS

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BOYS' AND GIRLS' CLUB WORK

**TOMATO GROWING FOR
CLUB WORK**

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A tomato club girl gathering her crop

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TOMATOES are easy to grow and can be used in so many ways that they are one of the most suitable garden crops for club work. While the actual food value of the tomato is not so great as that of some other garden crops, it has many important and valuable uses in the diet. Tomatoes may be gathered fresh from the garden during a period of from two to four months in summer, and by canning and drying, a supply may be provided for the table throughout the year. Tomatoes can be grown under many different conditions and on any good, well-drained soil. The cultural directions given in this circular are especially applicable under conditions prevailing in the Northern and Western States.

TOMATO GROWING FOR CLUB WORK

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When our great-grandmothers were girls tomatoes were called "love apples," and one or two plants were grown in the garden or flower beds for their bright red fruit. No one thought of eating them, as they were considered poisonous. After a time it was found that they were not poisonous and they soon became one of the standard garden vegetables. The tomato is closely related to the potato and, while its actual food value is not so great as that of the potato, it has certain qualities that make it one of the most desirable of our garden crops.

SOIL AND LOCATION

The first things to think of when selecting a plot for tomatoes are the soil and location. If early tomatoes are desired, a location near the top of a hill, where the ground is nearly level but slopes a little toward the south or southeast, is safer from frost than lower land and gets the full benefit of the sunshine. If there is a grove of trees or group of buildings on the north to break the force of the winds, it is so much the better. The land should drain well, but should not be so steep as to wash. The character of the soil must also be kept in mind. Good tomato land is neither extremely rich nor very poor, but just such land as would grow good corn or potatoes. Land that was manured heavily the previous year will generally grow good tomatoes. Do not select land where tomatoes were grown the year before, as certain diseases that attack the plants may be carried over winter in the soil.

FALL PREPARATION OF SOIL

Heavy clay soils and soils covered with sod should be plowed in the fall and allowed to lie in the rough state, exposed to freezing and thawing during the winter months. Unless the land is extremely rich, two or three loads of partially rotted stable manure should be spread over the ground before plowing and completely turned under. Sandy soils and soils that are easily worked need not be plowed until early spring. Another very good plan is to manure and plow the land early in the fall and seed it to rye to prevent the soil washing during the

winter months. This will necessitate reploting in the spring before the rye has made much of a growth; in fact, the rye should not be allowed to get over 3 or 4 inches in height before being turned under. Cornstalks or other coarse material should not be plowed under, as they will not decay quickly.

STARTING EARLY PLANTS

Arrange in early winter for seed and for starting the plants. The first problem will be the variety or varieties to plant. There are about six or eight standard varieties of tomatoes in general use, but two varieties, one extra early and one standard, will be sufficient for a one-tenth acre plot. The variety known as Bonny Best gives good results for early, and Improved Stone or Trophy for the main crop and for canning. Plant standard varieties and do not be misled and select some of the highly advertised or extra large kinds. A 5-cent package of seed of an extra early variety and one-fourth ounce of Improved Stone, or some other standard variety, will be enough to produce the plants required to set one-tenth acre.

As a rule club members will want their tomatoes to ripen as early as possible, and it will be necessary to start the plants either in the house or in a hotbed. In a few cases the plants can be procured from some greenhouse man or plant grower, but it is much more desirable for each member to grow his own supply of plants. About 650 good healthy plants will be needed for setting one-tenth acre. However, in



Fig. 1.—Club member preparing seed box.

order to be safe, at least 1,000 plants should be started. This number of plants can be grown in a shallow tray or box about 3 inches deep, 14 inches wide, and 30 inches long, placed in a south window of the home where it will get plenty of sunlight. This box should be filled with sifted loamy soil and the seed sown in rows crosswise of the box. By firming the soil with a board the rows may be laid off 2 inches apart by means of the edge of a ruler or thin strip of wood and the seed

covered to a depth of about $\frac{1}{4}$ to $\frac{1}{2}$ inch (fig. 1). The soil in the seed box should be watered from day to day as necessary to prevent its drying out, and just as soon as the plants appear the box should be turned each day to prevent their drawing toward the light (fig. 2).

Young tomato plants in the seed box frequently die from diseases which are in the soil. To guard against this loss, the soil should receive what is known as the hot water treatment several days before the seed is planted. The amount of soil necessary to fill the window box should be placed in a box about 1 foot deep and 4 gallons of boiling water slowly poured over it; at once cover with several thicknesses of newspaper to hold the heat. The box in which the soil is treated should have a few holes in the bottom so that the surplus water will escape. After the soil has cooled, it should be spread out to dry



Fig. 2.—Seed box showing plants.

before it is placed in the window box and the seeds sown in it. This treatment not only destroys the diseases that are present in the soil but will also kill most of the weed seeds.

Where a club group of members can work together, a hotbed is desirable for starting the plants.¹

Sufficient plants to plant a tenth of an acre or more can be started in a window box, but it will be necessary to have some kind of a protected outdoor bed or cold frame to which the little plants can be transplanted as soon as they begin to crowd one another in the seed box. The simplest form of cold frame consists of a shallow pit in the ground with an old window sash or two for covering it. The bed, or pit, should be located where it will get the full benefit of the sunlight and be protected from the cold winds of early springtime. To make such a cold frame, lay the sash on the ground where the pit is to be dug and mark around the outside of the sash, then remove the

¹Instructions for making hotbed are given on page 13.

sash and dig the pit 10 inches deep and about 3 inches inside of mark. If the soil is inclined to cave on the sides, the pit may be lined with old boards. Three or four inches of good soil should then be placed in the bottom of the pit. The plants should be transplanted about 3 inches apart in each direction and well watered with the sprinkling can. After plants are planted the sashes should be put on and a trench dug around the pit to keep all rain water out of it. If the pit is located on a slight hillside the water will drain from it better than if it is on level ground.

Another method of making a cold frame is to construct a framework of boards just large enough for the sash to rest upon its edges. This framework should be a few inches higher at the back or north side than in front, so that the rain will drain from the sash and also so the bed will get the full benefit of the sunlight (fig. 3). A layer of good soil

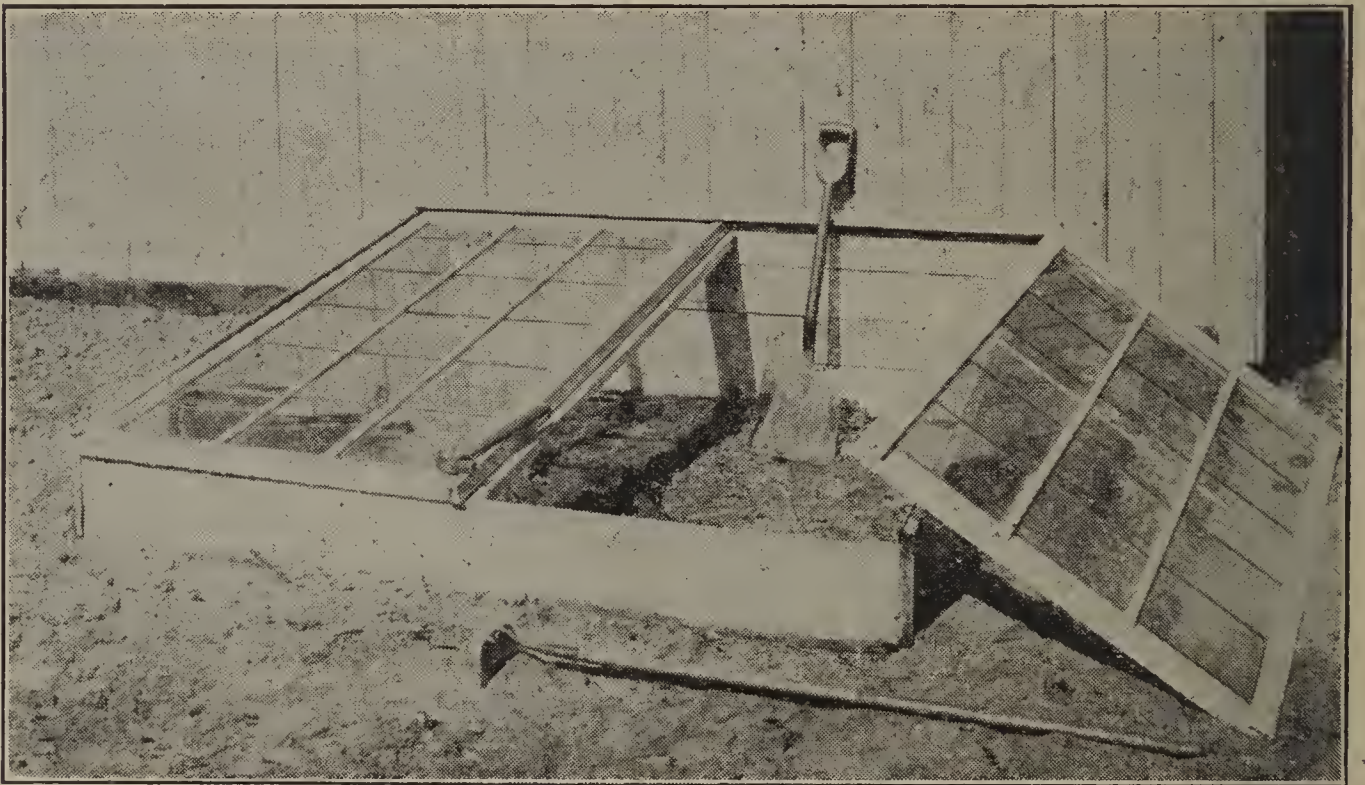


Fig. 3.—Cold frame. May be covered with heavy muslin instead of sash.

should be placed inside the frame the same as in the pit, and earth should be banked up on the outside to keep the bed dry and warm. If no glass-filled sash can be found, the bed may be covered with heavy muslin at night, and the covering be left off when the weather is warm enough in the daytime. It is also very important to ventilate the bed on bright days.

Before the plants are set in the open ground, they must be hardened by exposing them to outside conditions. This hardening process must be done gradually to prevent any serious check in their growth; and can be accomplished by leaving the sash or cloth covering off first during warm days and finally at night when the weather will permit. The covering, however, should be kept in readiness to be put on at any time that there is danger of frost.

FERTILIZERS

Tomatoes do not require large quantities of either manure or commercial fertilizers for best results, and if the land has been fall plowed and manured no further manuring will be necessary. If no manure was applied in the fall, two or three loads of rotted manure should be used as the top-dressing for the land in the spring. A better plan is to plow the manure under in the autumn, then replot and bring the decayed matter to the surface in the spring. Some very successful tomato growers spread a little well-rotted manure in the furrows where the rows are to be located and mix it thoroughly with the soil by means of a cultivator.

Fifty to eighty pounds of commercial fertilizer having an analysis of about 2 per cent nitrogen, 8 per cent phosphoric acid, and 7 per cent potash should be used on a tenth-acre plot. The fertilizer can be applied best by sowing in the rows and mixed with the soil in the same manner as the rotted manure; in fact, both can be applied at the same time. A slight bed or ridge should then be thrown over the fertilizer and manure and left to settle for at least a week or ten days before setting the plants.

SPRING PREPARATION OF SOIL

When the land is plowed in the autumn and left in the rough state through the winter months, it will be necessary in the spring to thoroughly disk and harrow it until it is in a fine mellow condition. If the land was not plowed in the fall, or if rye or some other cover crop was grown upon the land during the winter, spring plowing will be necessary.

The soil should not be worked, however, until it is in proper condition. If it adheres in a ball when pressed together in the palm of the hand it is, as a rule, too wet for working. Have the soil prepared fully two weeks before time to set out the plants, then give it an additional harrowing and dragging just before laying off the rows.

Tomatoes are seldom planted on raised beds in the North, but the same effect can be obtained by setting the plants level and then working the earth around them until a slight bed is formed.

DISTANCE TO PLANT

A plot of ground 2 rods wide and 8 rods long contains one-tenth of an acre. In terms of feet this would be 33 feet in width and 132 feet in length, or 4,356 square feet. A plot 40 by 110 feet contains a little over one-tenth of an acre.

Experience has shown that tomatoes give best results when the vines are trimmed and tied to stakes or some form of support. If trimmed to a single stem, the plants may be set as close as 3 feet

between the rows and 18 to 24 inches between the plants in the rows. If the plants are allowed to grow naturally upon the ground, the rows should be 4 feet apart and the plants 3 feet apart in the rows.

SETTING THE PLANTS

If the plants have been well grown they will be 4 to 6 inches in height, heavy and stocky at the time when danger of frost is past. Soak the plant bed thoroughly the night before the plants are to be lifted for setting. This helps to keep the dirt around the roots while moving them. The best method of removing the plants from the bed is to cut between them with a stiff-bladed knife or trowel and lift them with a block of earth 3 or 4 inches square adhering to their roots (fig. 4). As they are lifted they should be placed in a tray in which they can be carried to the plot of ground where they are to be set. For convenience in carrying the plants, a set of handles can be added to each tray by



Fig. 4.—Tomato plant in ideal condition for setting in garden.

nailing two strips of wood to the sides of the tray, so that they extend about a foot beyond the tray at each end. In this way two boys or girls working together can go to the plant bed, load the carrier with plants, carry it to the tomato plot, and set the plants direct from the carrier, moving it along the row as necessary. A wheelbarrow can be used for the same purpose. The plants must be handled carefully in order that the soil may not be shaken from the roots. The rows should be opened only

as needed, using a small turning or single shovel plow for making a furrow about 6 inches deep. If the land is at all dry, a pint to a quart of water should be poured around the roots of each plant as it is being set. A little dirt should be placed around the roots by hand, then later the earth should be drawn about them with a hoe and firmed a little. As soon as the tenth-acre plot is all set, the space between the rows should be cultivated in order to loosen the soil where it has been tramped and also to work it around the plants.

CULTIVATION

While it is necessary to keep crops clear of weeds, it is just as important that the soil be stirred to let the air get to the roots of the plants. The tomato plot should be cultivated with a horse cultivator at least once a week if the soil is dry enough, and the plants should be hoed after each cultivation. If a horse is not available, use a hand cultivator and thoroughly stir the ground. The surface of the soil should also be broken as soon as possible after every hard, beating rain. When the weather is extremely dry, shallow cultivation once a week will help to retain the moisture. Where the plants are trimmed and tied to stakes, cultivation should be continued up to the time that the fruit is being gathered, although the cultivator should not be run quite so close to the plants toward the last. Where the tomatoes are not trained to the stakes but allowed to run on the ground, they should be cultivated as long as there is room enough to get through the rows with the cultivator.

PRUNING AND TYING

While the greater part of the tomato crop of the North is grown by allowing the plants to spread naturally upon the earth, it has been



Fig. 5.—Tomato trained to stakes.

found desirable in boys' and girls' club work to prune the plants and tie them to stakes (fig. 5). In about a week or ten days after the plants are set out a stake 4 or 5 feet long and 1 inch or more in diameter should be driven beside each plant. Some growers prefer to string wires or use a lattice work of strips of wood to train the tomatoes upon. Stakes, however, are the simplest method and give excellent results. Small poles such as used for bean poles may be cut in the woods and used. Use a soft twine, or regular tomato twine, for tying the plants to the stakes or trellis (fig. 6). The twine should be looped around the stake so that it will not slip downward and then be tied loosely about the stem of the tomato just before a leaf. The plant should be pruned and tied about once a week.



Fig. 6 — Proper way to tie tomato plants.



Fig. 7.— Proper way to trim tomato plants.

In pruning the tomatoes, pinch out all the side shoots that appear in the axils of the leaves, that is, in the pocket where the leaf joins the stem (fig 7). The side shoots should be removed while they are quite small. Where earliness is an important factor, the heart, or top, bud of each plant should be pinched out after about five clusters of fruit have formed. This will throw the entire strength of the plant into the fruit. Where it is desirable to have the plants continue bearing throughout the season, the heart should not be pinched out, and a larger number of clusters should be allowed to form.

TOMATO DISEASES

As a precaution against diseases tomatoes should never be planted on the same land one year after another, as some diseases live through the winter in the soil. Another precaution is to burn and destroy all diseased vines and fruits. One of the most troublesome of tomato diseases in many localities is that known as blossom-end rot. There seems to be very little that can be done to prevent this disease, and it is often worse during dry weather than at any other time. Tomatoes are also affected by leaf blight and leaf spot, both of which cause the leaves to first become spotted, then to turn brown and die. Spraying with Bordeaux mixture is the best preventive for these diseases. To make 12 gallons of Bordeaux mixture, dissolve 1 pound of copper sulphate, or blue vitriol, in 6 gallons of water in a barrel or wooden tub. Slake 1 pound of fresh stone lime in just enough water to keep it from becoming dry and, when the slaking is complete, add enough water to make 6 gallons of milky solution, then pour the copper sulphate solution and the lime solution together, mix thoroughly, and use immediately. The spray will stick to the foliage better if instead of $\frac{1}{2}$ pound of the lime $\frac{3}{4}$ pound of rosined fish-oil soap is used. In this case, make up the copper sulphate solution and lime water to 5 gallons each, dissolve the soap in 2 gallons of water, and mix all together. This amount of mixture will thoroughly cover 300 to 500 well-grown plants and should be applied with a spray pump.

INSECTS INJURIOUS TO TOMATOES

There are three important insect enemies of tomatoes. Cutworms frequently cut off the plants just below the surface of the ground, especially just after the plants are set out. Extra plants should always be kept on hand for replacing any that are destroyed. The standard remedy for cutworms is known as a poisoned bait and is made up as follows:

Mix 1 pint of wheat bran, 1 level teaspoonful of white arsenic or powdered lead arsenate, and $\frac{1}{2}$ cup of cheap molasses or sirup with enough water to make the mixture thoroughly moist. Scatter a little

of the poison bait around each plant in the evening where the cutworms will find it during the night. Cutworms can also be kept away from plants by putting bands of stiff paper around the stems of the plants as they are set in the ground. Club members should always have the assistance of some older person when preparing and using poisoned bait and none of the poison mixture should be kept on hand.

The leaves and stem of the tomato are frequently eaten by two kinds of large green worms known as tomato hornworms. As these do not appear in great numbers, they can be killed by knocking them from the vines and crushing them. The tomato fruitworm, which bores holes in the young fruit, is often troublesome. The remedy for this insect is to spray the plants with a mixture of $\frac{1}{2}$ ounce of powdered lead arsenate in a gallon of water. The eggs that produce this insect are sometimes laid before the plants are taken out of the plant bed. For this reason, the plants should be sprayed with the lead arsenate solution once before setting in the open ground, and then at intervals of about two weeks until the first fruits are almost fully grown.

GATHERING AND MARKETING

Tomatoes are at their best when red ripe all over and before they begin to soften. If they are to be hauled a long distance or shipped to a distant market, they should be gathered before they are fully ripe. For early tomatoes it is very essential that they should be carefully selected and marketed in small packages in order to bring the highest prices. Extra large or rough fruit is not desirable. Tomatoes of medium size—that is, about $2\frac{1}{2}$ to 3 inches in diameter—smooth and perfect, bring the best price. If there are large numbers of small tomatoes they should be graded out and sold as culls or used at home. For express shipment, the regular 6-basket tomato crate is a good type of package. In gathering the tomatoes from the vines, remove all fruits that are ripe enough and place them upon a grading table consisting of a framework with a bottom of bagging or other coarse cloth that will not bruise the tomatoes. When a few baskets have been gathered, sort out the prime market size and pack them uniformly in baskets ready for sale. Handle the fruits carefully so that they do not become bruised. For extra fancy trade the tomatoes may be wrapped in soft tissue paper cut 9 inches square, the fold of the paper being placed underneath the fruit in the package so as to form a cushion for the tomatoes to rest upon. The use of wrapping paper, however, is not necessary for ordinary marketing but only for long-distance shipments.

CLEANING UP AFTER THE CROPS

Club members should take pride in cleaning up the plots after the crops have been gathered. The strings used in tying the tomato vines to the stakes should be cut and the stakes gathered in a neat pile or, if possible, placed under shelter ready for next year's work. The tomato vines should become thoroughly dry. If the vines are not diseased, it is all right to plow them under, but as a general rule the vines are more or less diseased and it is better to burn them and thus destroy whatever disease may be upon them. After plowing, the soil can be harrowed and sown to rye, crimson clover, or some other winter crop. If the green tomatoes remaining on the vines in the fall are removed before they become frosted and spread on a shelf either in a shed or in a cellar, many of them will ripen for home use. The small green tomatoes that will not ripen can be used for making relish or sliced tomato pickle, so that no part of the crop need be lost.

Green tomato sliced pickle is made as follows:

Select the small, perfect green tomatoes, wash, and slice from $\frac{1}{8}$ to $\frac{1}{4}$ inch thick. Place the sliced tomatoes in a stoneware jar or granite pan with plenty of salt sprinkled among the slices. Let stand over night, or for several hours, then drain in cheesecloth bag. Scald in boiling water on stove until the slices begin to become tender, drain, and cook in a sirup consisting of 1 quart cider vinegar, 1 quart water, and 2 pounds of sugar with 1 to 2 ounces of mixed spices added. Seal in glass jars.

MAKING A HOTBED

For the benefit of club members who wish to undertake and who have not had experience in the making of or caring for a hotbed, the following suggestions are given:

A hotbed is constructed in exactly the same manner as a cold frame, except that the bed is made deep enough that about 6 or 8 inches of horse stable manure can be trampled into the bottom to furnish a supply of heat for the bed. Sometimes one-half of the bed is provided with manure heat and the other half is left without any heating material to serve as a cold frame.

Select a well-drained location on the south side of a building or tight fence where the bed will be protected from cold winds and where there is good sunlight. Dig a pit 12 to 18 inches deep and the size of the framework of the hotbed. Throw in fresh horse manure and pack by tramping until the pit is full. The framework should be made the size to accommodate one, two, or more standard 3 by 6-foot hotbed sash. By a little crowding of the plants a bed 6 feet square will accommodate enough plants to set one-tenth of an acre. A bed 6 feet wide and 9 feet long and requiring three standard sash is a better size as it gives plenty of room to grow good stock plants. The bed should be 18 inches high at the back and 10 or 12 inches at the front with the slope toward the south. The manure in the bed should be covered with about 4 to 5 inches of good garden loam. The bed should be banked all around with soil or manure to retain the heat.

The manure will begin to heat within a day or two. It is a good plan to delay sowing the seed two or three days after making the bed, as the manure is liable to become very hot at first, and the seed should not be put in until the temperature has dropped a little.

If no sashes are available, the bed may be covered with heavy muslin, commonly called domestic, sewed together in the form of a sheet. One edge of this sheet should be tacked to the upper side of the bed and the opposite edge to a strip of wood that will serve as a roller upon which to roll the sheet during warm and bright days. The sheet must be securely tied down at night and on windy days to keep it from blowing off.

Throughout the Northern States great care must be taken to protect the plant bed during sudden drops of temperature, which are liable to occur at almost any time. In addition to the cloth or sash covering a supply of fine hay, straw, or better still, straw or burlap hotbed mats should be available for covering the bed during a cold period. Sometimes such cold snaps last but a single night, yet are sufficient to kill the plants unless precautions are taken. As a rule the heat of a hotbed spends itself about the time that the young plants are ready for transplanting, and the same bed will serve for starting the plants and for transplanting them.

During bright days the bed will heat very quickly and it will be necessary to ventilate by rolling up the sheet or raising the sash on the side opposite from the wind. Toward evening close the bed in order to get it warm before night. Water the bed in the morning and only on bright days, as watering in the evening or on cloudy days will increase the danger of freezing and "damping off." Ventilate the bed after watering in order to dry off the plants.

